



A.D. 1863, 4th FEBRUARY. N° 321.

SPECIFICATION

OF

JAMES ALEXANDER MANNING.

TREATING NIGHT SOIL, &c.

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Treating Night Soil, &c.

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LETTERS PATENT to James Alexander Manning, of the Inner Temple, London, Esquire, for the Invention of "IMPROVEMENTS IN THE TREATMENT OF NIGHT SOIL AND OTHER WASTE PRODUCTS, AND FOR THE MANUFACTURE OF MANURE THEREFROM."

Sealed the 14th July 1863, and dated the 4th February 1863.

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PROVISIONAL SPECIFICATION left by the said James Alexander Manning at the Office of the Commissioners of Patents, with his Petition, on the 4th February 1863.

I, JAMES ALEXANDER MANNING, of the Inner Temple, London, Esquire, do  
5 hereby declare the nature of the said Invention for "IMPROVEMENTS IN THE TREATMENT OF NIGHT SOIL AND OTHER WASTE PRODUCTS, AND FOR THE MANUFACTURE OF MANURE THEREFROM," to be as follows:—

This Invention relates to certain improvements upon the process or processes set forth in the Specification of Letters Patent granted to me on the  
10 3rd May 1860, No. 1343, by which improvements a larger per-centage of ammonia is secured from the night soil, and a more rapid conversion of the same into manure of a permanent and unvarying character is effected.

In carrying out this Invention I apply periodically a sufficient amount of sulphuric acid diluted with urine or superphosphate of lime or any other  
15 acids, or together with all or any of the chemical substances named in the Specification, by which the desired results may be obtained, to the cess-pits, privies, middens, or latrines of cities, towns, and considerable villages, for the purposes of deodorizing the night soil and retaining its ammonia by counteracting the effect which the fermenting quality of urine in its decom-



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position produces upon that element, and collect the night soil so treated, and treat night soil in general when otherwise collected, and evaporate the liquid portion of the mixed solid and fluid excreta of the population in towns and places where no sewers exist to dryness in iron or other retorts of suitable form and construction, so that a uniform quality of manure will be manu- 5 factured, composed of animal, vegetable, organic matter, phosphates, and alkaline salts, with the mineral constituents indispensable to the organism and development of plants, together with a considerable per-centage of ammonia.

By this modification of the process or processes specified in the before-named Patent, all wastes (other than night soil, or such animal matters as 10 contain a considerable per-centage of ammonia) that is to say, the wastes of vegetable markets, trades, household refuse, and vegetable wastes in general, treated as is therein set forth, by destructive distillation, or reduced to ashes in kilns or other suitable furnaces, and the ash products thus obtained are mixed with the desecated night soil, in order to increase the per-centage of the 15 mineral constituents so essential to the progress of vegetation, while the continuous deodorisation of the night soil at the houses of the inhabitants, and the destruction of all putrifying matters which accumulate in cities and towns to the great detriment of the public health, will tend greatly to the improvement of their sanitary condition and the general interests of the community. 20

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**SPECIFICATION** in pursuance of the conditions of the Letters Patent, filed by the said James Alexander Manning, in the Great Seal Patent Office on the 4th August 1863.

**TO ALL TO WHOM THESE PRESENTS SHALL COME, I, JAMES ALEXANDER MANNING**, of the Inner Temple, London, Esquire, send greeting. 25

**WHEREAS** Her most Excellent Majesty Queen Victoria, by Her Letters Patent, bearing date the Fourth day of February, in the year of our Lord One thousand eight hundred and sixty-three, in the twenty-sixth year of Her reign, did, for Herself, Her heirs and successors, give and grant unto me, the said James Alexander Manning, Her special license that I, the said James 30 Alexander Manning, my executors, administrators, and assigns, or such others as I, the said James Alexander Manning, my executors, administrators, or assigns, should at any time agree with, and no others, from time to time and at all times thereafter during the term therein expressed, should and lawfully might make, use, exercise, and vend, within the United 35 Kingdom of Great Britain and Ireland, the Channel Islands, and Isle of



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Man, an Invention for "IMPROVEMENTS IN THE TREATMENT OF NIGHT SOIL AND OTHER WASTE PRODUCTS, AND FOR THE MANUFACTURE OF MANURE THEREFROM," upon the condition (amongst others) that I, the said James Alexander Manning, my executors or administrators, by an instrument in writing under my  
5 hand and seal, or under the hand and seal of one of them, should particularly describe and ascertain the nature of the said Invention, and in what manner the same was to be performed, and cause the same to be filed in the Great Seal Patent Office within six calendar months next and immediately after the date of the said Letters Patent.

10 **NOW KNOW YE**, that I, the said James Alexander Manning, do hereby declare the nature of my said Invention, and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement, that is to say:—

My said Invention relates to the manufacture of manure from night soil, or  
15 the solid and fluid excreta of man, the constituents of which being the elements of bread and flesh, in fact of all the fruits of the earth, as well as the cattle raised thereon for man's consumption, are superior to other artificial manures in their fertilizing properties, and effects upon the soil in general, whilst by my process the per-centage of ammonia contained in the manure is but little inferior  
20 to that of the best Peruvian guano.

The mode I adopt for thus rendering permanently useful to agriculture all the human excreta collected in the privies or cess-pits of towns and other localities where no sewers exist, or where, as in some towns, they have been constructed merely for surface drainage; or again, where, as in Manchester,  
25 Glasgow, and other places, a large proportion of the privies or cess-pits have no communication or connection with the existing sewers, is as follows:—In the first place, it is necessary for the proper action and application of my process to towns and villages that all the privies or cess-pits shall be thoroughly lined with cement, so that neither the rainfalls nor overflows of water nor  
30 ordinary drainage may enter therein to dilute their contents, nor the fluid excreta allowed to escape therefrom to poison the land springs used by the inhabitants, and deprive the manure of its soluble salts. This preliminary being accomplished, I require that a wall of division shall be erected in the privies or ash-pits where coal ashes and household wastes are discharged into  
35 them, so as to separate the dry wastes in question from the excrementitious matters. These two necessary arrangements being made, I apply to the bottom of the empty privy or cess-pit a quantity of sulphuric acid (proportionate to the area of the privy or cess-pit, and the time required to fill it, but not exceeding altogether in its various applications from time to time the proportion



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of forty pounds of sulphuric acid to two thousand two hundred and forty pounds, or one ton of mixed solid and fluid excreta) such acid to be of the ordinary commercial strength, or diluted with three or four times its volume of urine. This acid is added for the purpose of converting all the ammoniacal salts contained in the solid and fluid excreta thereafter discharged into the 5 privy or cess-pit from time to time into sulphate of ammonia, and effectually preventing the evaporation which has hitherto occurred owing to the fermenting power or action of the urine in its decomposition, which converts the different salts into carbonate of ammonia, the most volatile of all the salts of ammonia, and by which upwards of 50 per cent. of ammonia is evolved 10 and passes away into the atmosphere to the pollution thereof, a great loss to agriculture, and the detriment of the public health. But in the treatment of the human excreta in the manner described, I only apply a sufficient or proportionate quantity of sulphuric acid to effect the object before described as regards fixing the ammonia contained in the first half ton or less of the mixed 15 faecal matter and urine discharged into the privy or cess-pit, as may be most advisable in practice, and when that amount of excreta is collected in the privy or cess-pit I add a similar dose of acid for the treatment of a further collection, and continue the practice from month to month, or less, until the privy or cess-pit is filled or ready to be emptied. 20

In this process I do not confine myself exclusively to the use of sulphuric acid alone, as I sometimes employ carbonized or dry sea weed, and especially the species known as the "Fucus nodosus," and dissolve the same in sulphuric acid, as also waste kelp, and reduce it to a pulverulent state, nearly resembling superphosphate of lime (which I also employ at times instead of the foregoing 25 preparations) and sprinkle the same at the bottoms of the privies or cess-pits, and subsequently, at the proper times when about half a ton of the excreta is collected therein upon the surface of the excreta, by which I increase the percentage of the mineral constituents of the manure indispensable to the organism and development of plants, at the same time adding considerably to the 30 deodorising properties of the acid by the application of the vegetable charcoal combined therewith. I also reserve the right of employing charcoal made from tanners' spent bark or other wood or coal ashes, prepared in the same or a similar manner with sulphuric acid in combination with or in lieu of the before-named substances. 35

When the cess-pits or privies are emptied, the matter removed is carted to the works and discharged into a tank or tanks of sufficient dimensions to hold one or more days' product of any town to which my process may be applied, and it is there agitated by steam or horse-power so as to amalgamate



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the whole and reduce it to a liquid or semi-fluid state, when it is passed from the lower extremity of the tank through covered shoots or troughs at a proper inclination, and charges a series or set of retorts by its own specific gravity on its passage.

5 These retorts I prefer to make of cast iron; they are heated by coal from three furnaces, one situate at each side of, and the third in the centre under the front of the retort, the lower half of which opens for the discharge of the product when the operation is completed. In their form the retorts are a very flat oval, in order to obtain the largest possible surface for the evaporation  
10 of the fluid portion of the excreta, the whole mass being kept in a continuous state of agitation as soon as it reaches the boiling point until the operation is completed by an agitator, which works backwards and forwards from the centre to each side to prevent the adhesion of the solid matter to the bottom of the retort; the retorts are only charged with the mixed fluid and solid excreta to  
15 half their capacity, in order to facilitate the rising of the vapour at or over their widest surface. To ensure a more rapid evaporation, I introduce by a fan or otherwise, a strong current of heated air over the surface of the boiling mass to drive off the vapour, chemical experience having demonstrated that this operation is productive of great economy of time, fuel, and labour, as well  
20 as reducing the number of retorts, which would otherwise be required in working a large town. When the fluid is evaporated and the solid matter is brought nearly to a state of dryness, by the preceding process, the lower half of the front of the retorts is unscrewed, the solid product is discharged into iron waggons and conveyed on a tram road to the drying and sifting houses,  
25 where it is prepared for the market.

The process herein described is also applicable to the treatment of the wet deposit of sewage obtained by precipitation, as set forth in the first part of the Specification of my Patent "for Improvements in the Treatment, Application, and Use of Sewerage Matters and general Wastes of Towns and Factories,"  
30 dated the Thirty-first day of May One thousand eight hundred and sixty, and Numbered 1343.

In witness whereof, I, the said James Alexander Manning, have hereunto set my hand and seal, this Twenty-fifth day of July, One thousand eight hundred and sixty-three.

35 JAMES ALEX. MANNING. (L.S )

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LONDON :

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Printers to the Queen's most Excellent Majesty. 1863.

